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Education, employment and practice: Midwifery graduates in Papua New Guinea

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Abstract

Background

Papua New Guinea has a very high maternal mortality rate (773/100,000), low rates of supervised births and a critical shortage of skilled midwives. A midwifery education initiative commenced in 2012, funded by the Australian Government and led by the National Department of Health. One specific objective of the initiative was to improve the standard of clinical teaching and practice in four schools of midwifery. There were 394 midwives educated over the 4 year period (2012 – 2015) representing half of all midwives in Papua New Guinea. A study was undertaken to describe the educational program, employment, practices and experiences of graduates who studied midwifery in 2012 and 2013 as part of the initiative.

Objective

The aim of this paper is to explore the education, employment and practice of newly graduated midwives in Papua New Guinea.

Design

A mixed methods descriptive study design was used. Surveys and focus groups were used to gather data. Ethical approval was granted by the relevant Human Research Ethics Committees.

Setting and Participants

All midwifery graduates in 2012 and 2013 from the four midwifery schools in Papua New Guinea were included in the study and almost 80% were contacted.

Findings

Nearly 90% of graduates were working as midwives, with an additional 3% working as midwifery or nursing educators. This study discovered that graduates exhibited increased skills acquisition and confidence, leadership in maternal and newborn care services and a marked improvement in the provision of respectful care to women. The graduates faced challenges to implement evidence based care with barriers including the lack of appropriate resources and differences of opinion with senior staff.

Conclusions

Factors affecting the quality of midwifery education will need to be addressed if Papua New Guinea is to continue to improve the status of maternal and newborn health. Specifically, the length of the midwifery education, the quality of clinical practice and the exposure to rural and remote area practice need addressing in many contexts like Papua New Guinea.

Keywords: Education, Midwifery; Students, midwifery: Transitional Programs; Midwife Attitudes; New Graduate Role; Developing Countries

Introduction

There are an estimated 250,000 births in Papua New Guinea (PNG) per year and most of these are in rural areas where 80% of the population resides (National Statistical Office of PNG, 2012, 2014). The rate of skilled attendance at birth is 44% (National Department of Health, 2013) and has not improved over the last decade. PNG did not meet the Millennium Development Goals for child (MDG4) or maternal health (MDG5). Whilst it has been difficult to measure directly, the Maternal Mortality Ratio (MMR) is estimated to be 773 per 100,000 births, making it one of the highest in the world (National Department of Health, 2006).

The most recent State of the World's Midwifery Report (SOWMY), estimated that the workforce in PNG providing maternal and newborn health meets only 49% of the need required for effective maternal and newborn care (UNFPA, ICM, & WHO, 2014). A report by the World Bank also highlighted a severe health workforce shortage across all cadres, however the need for midwives to address issues of deteriorating maternal mortality rates was highlighted (World Bank, 2011).

Given the high maternal mortality rate, low rates of supervised births and the health workforce shortage, the PNG government recognised that efforts needed to be directed towards increasing the number and quality of midwives. Recommendations regarding the preparation of midwives and the acute need to increase capacity in emergency obstetric services and access to family planning arose from the Ministerial Maternal Health Taskforce meeting in 2009 (National Department of Health, 2009).

For the five years prior to 2009, there were approximately 250 midwifery graduates who were not registered due to concerns with their competency to practice (National Department of Health, 2009). A review of midwifery education programs in PNG (Kruske, 2006) showed that midwives were graduating with insufficient skills and knowledge. A revised curriculum framework was developed in 2008 which was competency based with the theory to clinical components ratio of 40:60 as

recommended by the International Confederation of Midwives. (International Confederation of Midwives, 2013). At the time, it was only feasible from the perspective of the government to have a 12 month course although more recently efforts are being made to increase this to 18 months.

Scaling up midwifery education

In direct response to the insufficient numbers of skilled midwives and a national taskforce which highlighted the crisis in maternal and newborn health (National Department of Health, 2009), an initiative commenced in 2012 to scale up midwifery education. This was funded by the Australian Government and led by the PNG National Department of Health (Dawson et al., 2015). One objective of the initiative was to improve the standard of clinical teaching and practice in four schools of midwifery. In 2010, these schools had introduced a 12 month post nursing Bachelor of Midwifery degree underpinned by a new curriculum framework. The curriculum is competency based and includes a 60% practical component. Students spend one month on a rural clinical placement, and an Emergency Obstetric and Newborn Care Course (EMoNC) is included within the program. Twenty scholarships at each of the four institutions were provided annually by the Australian Government as part of Overseas Development Aid (ODA).

This scale up of midwifery education also involved increasing support for midwifery educators to deliver the new curriculum and provide improved clinical supervision. Teaching and clinical simulation resources were provided or updated with ODA funding. Eight international Clinical Midwifery Facilitators (CMFs) were appointed to work alongside national midwifery educators to build their capacity in teaching and facilitating clinical practice. Three hundred and ninety four (394) midwives were educated over the four year period of the initiative (2012 – 2015). This number comprises 55% of the current estimated number of midwives ($n \geq 700$) in PNG (Papua New Guinea Nursing Council, 2015; UNFPA, 2011).

Aim

The aim of this paper is to explore the impact of strengthening midwifery education in PNG. In particular, the study sought to explore the education, employment and practice of newly graduated midwives in PNG. The graduates were those who studied midwifery in 2012 and 2013 as part of an initiative to scale up midwifery education.

Methods

Design

A mixed method descriptive study was undertaken using a range of approaches, including surveys, focus groups and interviews. Ethical approval was granted by the PNG Medical Research Advisory Committee and the relevant university Human Research Ethics Committee.

Recruitment

A total of 181 midwifery students (160 were on scholarships, 21 were self-funded) commenced their training in the four midwifery schools in 2012 and 2013 and 174 graduated. Graduates were recruited to participate in the research either directly or through approaching educators, supervisors or fellow graduates. Attempts to contact all 174 midwifery graduates were made either by telephone, email or by asking them in person. Of graduates, 138 (79.3%) were contacted successfully and consented to participate. There were no refusals. Most of the graduates who could not be contacted were known to be working in very remote areas which made recruitment impossible.

Participants were provided with an information sheet and consent form prior to being interviewed. Written consent was obtained from all participants who were contacted in person. Consent was given verbally to the researcher for those surveys completed by phone, after the information sheet had been read to them.

Data Collection

Graduates from each of the four midwifery training schools were surveyed either in person (n=55; 39.9%), or by phone (n=79; 57.2%) from November 2014 to April 2015. Data collection was undertaken by one of three researchers (two PNG nationals and one expatriate midwife who was familiar with the country) all who had been briefed on the study and the method of data collection. The researchers read each question during the telephone interviews and wrote the graduates' responses verbatim.

Data Analysis

All survey responses were entered into Excel spreadsheets. Quantitative data were uploaded into SPSS and analyzed using simple descriptive statistics. A content analysis was used to examine the qualitative data. Qualitative data were openly coded (Benaquisto, 2008) to identify concepts and categories and then from these themes and sub-themes were ascertained by the in-country research team.

Findings

Location and Employment

Almost all respondents (89.3%) were working as midwives. In addition, eight graduates had either returned to, or commenced teaching in midwifery or nursing education positions. Graduates were located in 21 of the 22 provinces of PNG (Figure 1) and were predominantly in urban areas, although 41% were working in rural areas. Of those in rural areas, 9% were working in district hospitals with 32% in smaller rural health centres (Table 1).

<Figure 1 here>

<Table 1 here>

Preparation for practice

Graduates were asked to reflect upon how the theoretical, clinical and rural practice components of their education course had prepared them for their current clinical practice. Most reported satisfaction with how the theoretical component of the course prepared them for practice with 88% rating this aspect as “above average” or “extremely well”. Twenty eight (20%) made specific comments regarding topics that they felt were not covered well; specifically public health, research and study skills. Those who rated the theory as being “average or below average” generally commented that the course needed to be longer than 12 months to adequately cover the required content.

Most respondents (81%) rated the clinical component of their course as “above average” or preparing them “extremely well”. The clinical experience gained during the course was credited for improved practice after graduation, for example:

“I had experience before, but I have confidence now”

“The hours spent has made us all confident and competent”

“The course was really great. Previously I had a maternal death for eclampsia. Referred but she died. When I went to school I learned about magnesium. I came across those cases and learned a lot”

There was reflection that the skills they learned in general nursing education had not adequately prepared them to care for childbearing women.

“As a general nurse, I did not know what caring for a woman was. Now - I do everything for the woman”

"I did not know how to do complicated deliveries or manage postpartum haemorrhage (PPH) before but now after the midwifery training I am able to do it"

Some graduates particularly liked being able to practice at large centres which provided increased opportunities to learn about complex care.

Preparation for rural and remote work

Almost all graduates (83%) rated their ability to work in rural or remote areas as "above average" or "excellent". Key comments in this category included statements such as:

"I am confident I can manage problems effectively in remote areas"

"They taught me how to pick up risk and refer straight away to the hospital. A one week EMoNC was also taught and practiced by all of us. We were also taught about the referral systems"

"Very helpful to recognise women who need referral. We have had no antenatal maternal deaths because we pick (up) problems and talk to the doctors who tell us what to do"

Graduates currently working in rural areas felt that they were now able to provide care for women at the facility level which had reduced the number of women needing transfer to a higher level facility. This was also reported to reduce delays for women to receive care and reduced costs associated with transfer for women and their families.

"At the moment I am able to identify risk factors and refer early and also can handle most of the obstetric complications in remote places or may refer whenever necessary"

A number of respondents (n=28, 20%) commented that they would have preferred more time dedicated to clinical practice. They especially liked the opportunity to work with specialist obstetricians and registrars to improve their skills. Many expressed the desire to spend more time in provincial hospitals before returning to rural areas to build their skills and confidence.

"Need more time with doctors especially for emergencies before we go back to the bush"

"We need more time to practice and get confident"

Improved emergency skills

The majority of graduates (n=71; 52%) commented that the best part of their education was gaining knowledge, skills and confidence in emergency procedures saying it was "vital", "helpful", "practical" and "I use it now". Other comments included:

"We previously had these emergencies but didn't know what to do.... I did my best but they [the women or babies] died.... Now I know what to do"

Another understood that *"things that I did previously made conditions worse"*.

Being able to care for women requiring emergency care in remote areas was seen as important as *“it is hard to transfer women”*. Those working in hospitals also reflected that they were able to reduce delays in care as:

“managing PPH ... I can manage them without waiting for a doctor”

Practising in a labour ward in particular gave graduates *“confidence and competence”*. They appreciated being able to work in busy clinical areas where there were plenty of women and therefore complicated cases and emergencies. They learned *“many new things”* and specifically enjoyed learning about recent advances in clinical practice. Gaining experience in complicated births was a common theme, for example:

“I learned to deliver breech births... I have delivered two breeches and they are doing well”

Self-Assessment of competence in basic midwifery skills

Graduates were asked to self-assess whether they could perform basic midwifery skills independently, under supervision or with more training. The majority (90-97%) of graduates felt that they could perform the basic skills independently. Some stated that they would like further training in some skills especially HIV counselling and testing. Up to 18% felt they would like supervision with some skills and did not feel they had sufficient episodes of care during their training to feel confident. The most common skill requiring further supervision was the care of women with obstructed labour (Table 2).

<Table 2 here>

Confidence in Emergency Obstetric Skills

Graduates were asked to self-assess their acquisition of emergency skills (EMoNC) and other advanced skills based on the ICM categories of midwifery competencies (International Confederation of Midwives, 2013). Graduates reported that they could independently care for most emergencies especially postpartum haemorrhage (PPH) and neonatal resuscitation (Table 3).

<Table 3 here>

Many respondents still lacked confidence in emergency or additional skills. Up to 40% of graduates felt that they would like supervision with some skills (Table 4).

<Table 4 here>

At least half of respondents requested further training in the insertion of an Intra Uterine Contraceptive Device (59%) and insertion of hormonal contraceptive implant (51%). Implantable contraceptives only became available in PNG in 2012 and education regarding their insertion was not offered until 2013. Some (n=30) graduates reported that they did not have enough time to practice skills in this clinical area and that they would have benefited from longer clinical rotations. Eleven participants described difficulties with securing enough time to practice during clinical placements and felt that medical students, resident medical officers and health extension officers (HEO) students¹ were given priority over midwifery students to practice procedures. There were 20 comments about not having enough clinical supervision, either from educators or hospital staff.

Impact of the midwifery education on practice

Graduates were asked “What skills or behaviours you have changed or do differently now that you have a midwifery qualification? Explain”. There were 132 responses to this question and comments made about 359 separate skills or behaviours that had changed since their education. These were classified into three descriptive categories: improved or new clinical skills; providing respectful care; and, showing leadership skills.

Improved or new clinical skills

Developing new clinical skills was an important impact of the midwifery education opportunity and this covered a range of areas. For example, one graduate said:

“Doing procedures, we were not doing the right thing. Now I have learned the proper way to do them e.g. (I used to) fiddle with the fundus. Now I wait for separation, (give) oxytocics and (use) controlled cord traction... we have decreased our retained placentas”

Newborn care featured strongly in the changes including practicing skin-to-skin, initiating early breast feeding, performing neonatal examination and encouraging Kangaroo Mother-Baby Care for premature babies.

There were improvements noted in clinic management as indicated in this quote:

“I use the labour record book. Making sure we have enough EmOC drugs, PPH Box, MgSO⁴ box. Our aim is no maternal deaths”

There were accounts of reducing unnecessary referrals when skills had improved -

¹ Health extension officers are a high level health worker and perform similar to a resident medical officer

"Now I can do by myself. Now I only refer the real necessary ones. Now retained placentas I do on my own"

Graduates felt that their new skills were saving lives. In urban areas they perceived that there were decreased delays in women receiving care as midwives were detecting complications and emergencies and able to respond quickly. This was articulated in quotes like these:

"I am saving a lot of lives and have great job satisfaction"

"Helping me save mothers - particularly from PPH"

"Emergency procedures prepared me well. Most maternal and neonatal deaths are related to lack of knowledge about how to look after emergencies. Before I was scared, now I'm not"

"Plenty of changes (are) happening... before 3 in 100 babies and mothers die, but it's improving"

"Midwives can detect things early and treat them or refer them to stop delays"

"Treating PPH – (I have) helped 10 mothers - none died"

Providing respectful maternity care

Disrespect and abuse in labour had previously been a significant area of concern in PNG and the new education programs included components to address this issue. The largest single category of responses about improvements in care was related to respectful maternity care (66 responses). Graduates perceived themselves as changed people who will make a difference in their communities and health facilities, for example:

"I have a renewed mind, heart, and voice approach to ANC (antenatal) clients. e.g. I smile and greet all ANC clients and talk to them in a friendly voice"

"Woman-centred care, treating (her) as a mother not as a client....really changed me. My approach has changed"

"Mostly to changing my attitudes to women and children. Take them as they are and respect them and care for them - keep them safe"

Many reported that they no longer yelled and screamed at women who were in labour. Participants said that women were now allowed to move around freely in labour without fear because graduates are providing quality midwifery care and are not being disrespectful as they had done before, for instance:

"My attitude towards the mothers has changed, I used to shout at them but now I do not"

"Before the mothers were frightened – now I've changed"

"I greet the women, talk to them nicely, I stay with the women until she gives birth"

"Before I used to force them and scream at them but now allow woman to labour and birth in any position they feel comfortable"

The graduates felt that women were motivated to attend the health facility for a supervised birth in response to the provision of improved midwifery care and health education. Many rural respondents also reported that more women were coming for supervised births when communities heard that there was a trained midwife available.

Showing leadership skills

Many graduates returned to a position with additional leadership responsibilities. There was evidence of graduates sharing their new knowledge with others and applying it in a direct way to develop services and lead others, for example:

"Neonatal resuscitation – now I can do it and teach others. A lot of babies are born flat and we are resuscitating them and they are doing well"

"Before I did not see the stats and resources in labour, but now I do it and make sure everything is done"

"I moved the antenatal clinic to near labour ward so women can see labour ward and think about coming for a supervised delivery"

"I started a special clinic for HIV women. Trying to improve practice, have equipment needed"

Graduates felt their education gave them the confidence to lead colleagues in providing quality midwifery care.

Discussion

Graduates of the 2012 and 2013 cohort included in this study now make up 25% of the registered midwives in PNG and are providing midwifery care in nearly every province in PNG. The vast majority (90%) are working as midwives indicating successful employment after graduation. There is evidence of graduates developing confidence as midwives. Whilst most graduates felt that the course had prepared them adequately for practice as a midwife, some participants recommended improvements to the midwifery course, particularly increasing in length both theoretical and practical components. The time spent on emergency skills was most beneficial to them.

Distribution and employment

It is exceptional to note that almost all of the graduates were working as midwives and that they were located in nearly every province of the country. Thirty nine percent of respondents were working in rural areas. This is encouraging, but having a period of compulsory rural service and necessary incentives to deploy graduates to rural areas and necessary incentives needs to be

considered. However, in countries where there is an acute shortage for midwives in all settings, graduates in urban areas are also urgently needed. Graduates may seek to fill urban positions before rural vacancies because of increased infrastructure and services and increased opportunities for professional development. Our study showed that those students recruited from rural areas were more likely to return to rural areas in response to the needs of women in those areas. Therefore, targeting of applicants to study midwifery from rural areas may result in improved deployment of midwives to rural areas. This echoes other literature (Jayasuriya, 2012; Lori, 2012; Yé et al., 2014) that discusses the importance of incentives to attract midwives to rural areas.

The focus on midwifery education in PNG has greatly enhanced the capacity to provide care for expectant women in many parts of the country. There is now overwhelming international evidence supporting the investment in educating midwives to lower the maternal mortality rate and to ensure quality care can be provided to women and newborns (Horton & Astudillo, 2014; Renfrew et al., 2014; ten Hoope-Bender et al., 2014). Educated, regulated and enabled midwives can provide 87% of the essential interventions for Sexual, Reproductive, Maternal and Neonatal Health (SRMNH) (Partnership for Maternal, Newborn and Child Health, 2011). The *Lancet Series on Midwifery* showed that midwifery care, including family planning and access to specialist care when needed, could avert a total of 83% of all maternal deaths, stillbirths, and neonatal deaths (Homer et al., 2014). Midwives are most effective when integrated into the health system in the context of effective teamwork, referral mechanisms, and sufficient resources (Renfrew et al., 2014). Efforts at all levels are still required if the new graduates are to reach their full potential in PNG.

Reflection on preparation for practice

Graduates reflected positively on all aspects of their education. More than 80% of students remarked that their education had prepared them well for practice. Areas for improvement were noted and many of these reflected the development of the curriculum over time, particularly as new contraceptive technologies became available. The primary improvement suggested was extending the length of the course a further 6 – 12 months in order to complete the necessary requirements and allow enough experience to achieve competence. Achieving the international guidelines (International Confederation of Midwives, 2013) which recommends an 18 month course duration for post nursing midwifery education would provide the necessary opportunities to gain competence and confidence.

Self-assessment of skills

Over 90% of the graduates assessed that they were competent in basic midwifery skills. Some students commence their midwifery education with generic skills as they provided care for pregnant women in their general nursing. However, when it came to the midwifery specific or advanced skills

as per the ICM definitions (International Confederation of Midwives, 2013), only up to 60% of these graduates felt competent and confident. This indicates that extra attention should be given to these areas within the curriculum to increase the competence of graduates. Extending the clinical component of the course would provide additional opportunities to practice these skills and become more confident before graduation. This is given more importance when it is acknowledged that often the graduate is the only midwife in a rural setting and has a responsibility of leading and training other staff.

Building capacity in emergency skills

The major focus of recent global efforts to improve maternal mortality has been ensuring that health care workers involved in maternity care are trained in key skills in obstetric and maternity emergencies (Ameh & van den Broek, 2015; Bergh, Allanson, & Pattinson, 2015; National Department of Health, 2009; Olorin, Gomez, Currie, Thapa, & Dao, 2015). The PNG midwifery initiative included a focus on emergency obstetric and neonatal skills (Dawson et al., 2015). The midwifery students had all previously worked as nurses and as such had been exposed to obstetric emergencies. Graduates in our study commented that it was emergency obstetric and neonatal skills that were of most benefit, yet they needed more confidence. Ongoing support and supervision needs to be provided to ensure that midwives continue to grow in confidence to provide emergency obstetric care.

There is currently little evidence on the perceptions and experiences of midwives after pre-service training especially in relation to emergency skills. One example is from Rwanda which examined the perceptions of midwives following an Advanced Life Support in Obstetrics® (ALSO®) course (Uwajeneza, Babenko-Mould, Evans, & Mukamana, 2015). Midwives perceived that they were reducing maternal mortality and expressed the satisfaction that that brings. A quantitative study in Tanzania (Sorensen et al., 2011) also showed that the detection and treatment of PPH had significantly improved following a two day ALSO® course. Our study explored similar perceptions but sometime later (1-2 years following pre-service training) and showed continuing application of EMoNC skills. This strengthens the importance of education and training in obstetric emergencies must be embedded in midwifery training at a pre-service level (International Confederation of Midwives, 2013).

Addressing disrespectful and abusive care

There has been a significant improvement in respectful care given by the graduates to the women and families they serve. Graduates reported that more women are coming to health facilities for both antenatal and birthing services. There has been much attention over the last decade concerning

the attitudes of health staff to women, particularly during labour. There are many reports of disrespect and abuse of women including verbal and physical abuse during labour (Bohren et al., 2015; Browser & Hill, 2010; Miller & Lalonde, 2015; National Department of Health, 2009; Ouédraogo et al., 2014; Vogel, Bohren, Tuncalp, Oladapo, & Gulmezoglua, 2015; White Ribbon Alliance, 2011). This significantly impacts the woman's desire to attend facilities for birth which then increases morbidity and mortality by delayed responses to emergencies (Bohren et al., 2015; International Federation of Gynecology and Obstetrics, International Confederation of Midwives, White Ribbon Alliance, International Pediatric Association, & World Health Organization, 2015; Miller & Lalonde, 2015; National Department of Health, 2009; Srivastava, Avan, Rajbangshi, & Bhattacharyya, 2015; Vallely et al., 2013; Vogel et al., 2015).

The improvement in respectful midwifery care reported by the graduates in our study is encouraging. They seemed to be seeing the benefits of a caring relationship with women. The midwifery skills of providing support in labour and helping to reduce a woman's fears are beginning to be understood by the graduates and the staff they work with. These changes are significant considering the numerous previous comments about disrespectful and abusive care that is common in PNG (King, Passey, & Dickson, 2013; National Department of Health, 2009; Vallely et al., 2013).

The global campaigns to improve respectful maternity care have largely focused on the human rights of women (Bohren et al., 2015; Hastings, 2015; Vogel et al., 2015; White Ribbon Alliance, 2011). The midwifery education in PNG concentrated on role modelling positive behaviours and respectful attitudes. Graduates noted that the largest change in their care was in their attitudes to women and the way they cared for them. They understood the negative effects abuse and fear has on women in labour and recognised it was often why women did not attend health facilities for birth.

Limitations and challenges

Our study has limitations that need consideration. Attempts were made to contact all graduates however we were unable to contact some and many of these were in remote areas. Their responses would have been valuable to compare the responses of other rural midwives in more accessible areas. We would have liked to compare the demographic details of the 394 midwives who were educated over four years compared to the survey sample to confirm a representative sample and also to compare responders with non-responders but these data were not possible to obtain given the many challenges in the PNG health system. Due to the other difficulties in access and telecommunications in PNG (the postal system is challenging and there is often no phone or internet

access, we had to use different modes of data collection, face to face and phone. It is possible that written surveys could have been misinterpreted or that respondents were unwilling to give responses verbally. The researchers who collected that data were well versed in PNG culture and styles of communication and we feel that despite the different methods, the findings are robust given the context.

Many graduates reported that increasing numbers of women are attending their facilities for birth. This is putting additional strain on the staff and the facilities. In PNG, there is evidence of improving facilities across various districts. This is to be commended, strengthened and continued. Women appear to be coming when they hear there is a midwife based at the health facility that can help them. This needs to be verified by the next demographic and health survey, which is due to be conducted in PNG in 2016-2017.

An improvement in data collection and reporting at rural and district hospitals and health centres of episodes of care is also essential if improvements in care are to be examined. Further research could determine whether any increased attendance is an effect of having skilled, compassionate midwives providing care at that level.

Ongoing research needs to be conducted to detect quantitative changes in maternal and neonatal morbidity and mortality in PNG. This is similar to other reports of evaluations of training skilled birth attendants (Ameh & van den Broek, 2015; Bang et al., 2014; Carlo et al., 2010). While they show short term improvements in skills, they do not necessarily demonstrate causal effects on the reduction in mortality and morbidity in lower and middle income countries (LMIC). Training of midwives is one part of a package of interventions aimed at reducing mortality (ten Hoope-Bender et al., 2014). Educated midwives need to work in a system where attention is paid to effective teamwork, adequate referral mechanisms and sufficient resources (Renfrew et al., 2014). Continuing to put effort into all components is essential if improvements in maternal health are to be realised.

Conclusion

Support to midwifery education in PNG over the past 4 years has developed a significant number of new graduates who are registered as midwives working across the country to provide improved maternal and newborn care. It is encouraging that 90% of the respondents were working as midwives. This study has highlighted a number of important benefits including increased skills acquisition and confidence, an ability to provide leadership in maternal and newborn care services and the provision of respectful care to women through improved attitudes.

The new midwives have a sense of urgency to do what they can to reduce the high maternal mortality in PNG. They are using the midwifery skills and knowledge gained during their midwifery education to improve health for women and babies. The graduates faced challenges to implement evidence based care but were doing so wherever possible. The two main barriers to this were the lack of appropriate resources and differences of opinion with senior staff.

There is still room for improvement and a number of areas have been identified as requiring attention if PNG is to be able to improve maternal and newborn health. In particular, the length of the midwifery course, the quality of clinical practice time and experiences in rural areas. The unexplored potential for midwives to be based in the community rather than in a health facility has great merit for PNG. The country however, like many other low income countries, still has a great need for skilled midwives.

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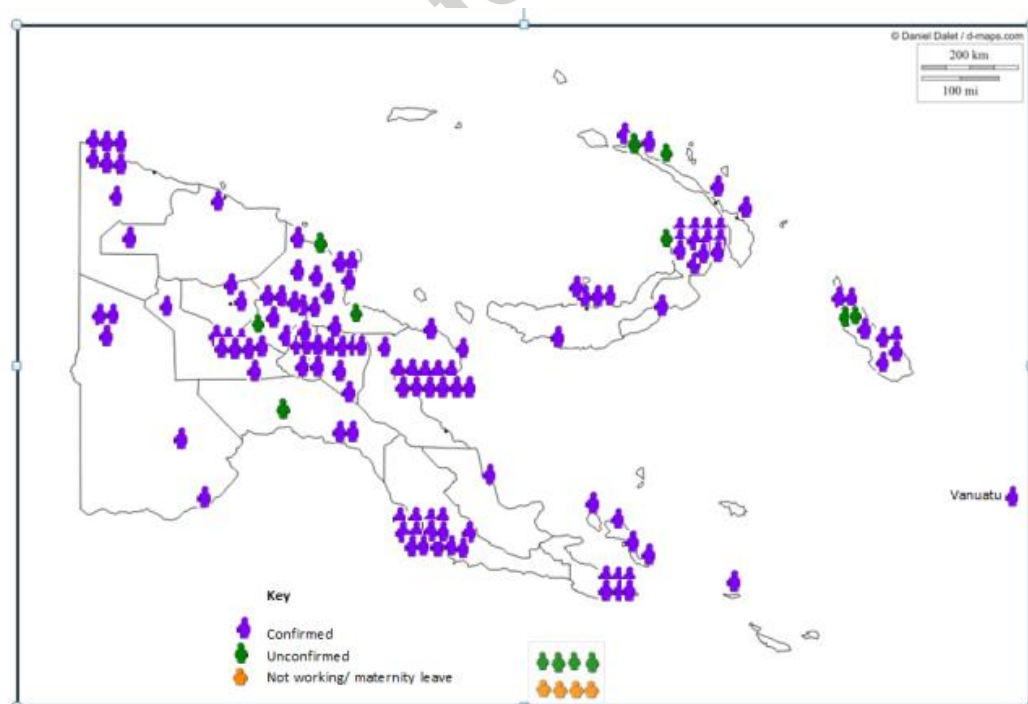
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Figure 1: Location of midwifery graduates 2012 and 2013 cohorts



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Table 1: Employment by type of facility

Type of facility	Rural or Urban	No of graduates	% of graduates	No of graduates surveyed	% of graduates surveyed
Aid Post [*] , Health Sub-Centre ⁺ or Health Centre ⁺	Rural	56	32	38	68
District or Rural Hospital ^{>}	Rural	16	9	15	94
Urban Clinic [#]	Urban	5	3	5	100
Provincial Hospital [∞]	Urban	72	41	63	88
NGO's and Private Hospitals	Urban	5	3	5	100
Educators	Urban	8	5	8	100
Unconfirmed, Not working/ on leave	-	11	6.3	4	36
Foreign Student	-	1	0.6	0	0
TOTAL		174		138	

^{*}Provide basic care on an outpatient basis only. Usually one health worker.

⁺Provide outpatient and some inpatient services. May have labour and postnatal wards and provide antenatal clinics. Basic emergency supplies and referral to provincial hospital. May not have own transport. Do not have doctors.

[>]Larger rural centre that can provide basic emergency obstetric services. Usually have transport available. May not have a doctor.

[#]Urban Clinics are located in provincial centres and major towns and provide outpatient antenatal and reproductive health services, including family planning

[∞]Provide comprehensive emergency obstetric services. Most but not all have a trained obstetrician. Antenatal clinic normally provided through associated urban clinic.

Table 2: Skills requiring further supervision

Skill	Percentage of responses
Care of women with obstructed labour	17.4%
HIV counselling, testing and treatment	11.6 %
Diagnose and treat postpartum sepsis	10.1 %
Care of women with gynaecology problems	10.1 %
Care of babies needing phototherapy	9.4 %
Manage perineal trauma (postnatal)	9.4 %
Assess and plan for a sick neonate	8.7 %
Vaginal examinations	8.0 %
Care of a woman undergoing induction of labour	6.5 %

Table 3: Emergency and Advanced Skills able to be performed independently

Skill	Percentage of responses
Management of primary PPH	97.1 %
Provide care for a woman with a secondary PPH	93.5 %
Neonatal resuscitation	88.4 %
Care for a woman with a multiple birth	76.8 %
Resuscitate a woman	76.1 %
Manage a shoulder dystocia	66.7 %
Undertake a manual removal of placenta	66.7 %
Manage a breech birth	65.9%
Manage a woman with pre-eclampsia or eclampsia including giving magnesium sulphate (MgSO_4)	65.2 %

Table 4: Emergency and advanced skills requiring supervision

Skill	Percentage of responses
Perform external cephalic version	39.9 %
Vacuum extraction	35.5 %
Manage pre-/eclampsia including MgSO ⁴	32.6 %
Manual removal of placenta	29.0 %
Manage a breech birth	28.3 %
Manage shoulder dystocia	26.1 %

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